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ABSTRACT

This critical analysis examines the claim that learning within the student's zone of proximal development is enhanced by "making connections to what the learner already knows." It is argued that Rogoff's and Gardner's use of Vygotsky's theory to explain learning in school-like tasks places primary emphasis on how the adult should connect the task to children's everyday, familiar concepts. Their analysis, however, is inconsistent with Vygotsky's characterization of school learning. Vygotsky emphasized that school learning in the zone of proximal development is advanced by helping the student understand decontextualized concepts within a discipline. Connections to students' everyday concepts come later. In the critique, examples are drawn from Vygotsky's work and more recent research on instruction to support this position. The analysis also draws on current research in science education to support the view that students' everyday concepts may interfere with learning unfamiliar, scientific concepts. Since Vygotsky's zone of proximal development continues to serve as an influential framework for understanding learning in everyday school contexts, it is important that researchers applying it to school settings incorporate his analysis of the limitations of everyday concepts. A three-page list of references concludes the document. (LMO)

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The Use of the Zone of Proximal Development in Everyday and School Contexts: A Vygotskian Critique[1]

Using Vygotsky's (1978) zone of proximal development as an analytic tool, cognitive psychologists (Rogoff & Lave, 1984) have studied how learning takes place in everyday social contexts. Included in this group of studies are suggestions concerning how learning more effectively occurs in school-like experimental tasks (Rogoff & Gardner, 1984). For both everyday and school-like tasks, these researchers suggest that an adult should make connections to what the learner already knows in order to promote learning. The aim of this paper is to critically analyze the claim that learning within the student's zone of proximal development is enhanced by "making connections to what the learner already knows." It is argued that Rogoff's and Gardner's use of Vygotsky's theory to explain learning in school-like tasks places primary emphasis on how the adult should connect the task to children's everyday, familiar concepts. Their analysis, however, is inconsistent with Vygotsky's characterization of school learning. Vygotsky emphasized that school learning in the zone of proximal development is advanced by helping the student understand decontextualized concepts within a discipline. Connections to students' everyday concepts come later. In the critique, examples are drawn from Vygotsky's work and more recent research on instruction (Collins & Stevens, 1982) to support this position. The analysis also draws on current research in science education to support the view that students' everyday concepts may interfere with learning unfamiliar, scientific concepts (Driver, 1983;

Eaton, Anderson, & Smith, 1984; Roth, 1985). In conclusion, I consider the impact of this analysis for the use of Vygotsky's theory to promote school learning.

Social Context: The Focus of Analysis for Individual Development

Contemporary western cognitive psychology has been criticized for its excessive concern "with the isolated, self-contained agent and ignoring the issue of how psychological processes are normally embedded within social settings" (Wertsch, 1981; p. 276). In contrast, Soviet approaches to psychology have focused on the social origins of individuals' cognitive abilities. Their research, especially Vygotsky's (1962, 1978) seminal work, has contributed significantly to our understanding of how social interaction provides the basis for individual cognitive abilities. Vygotsky (1978) proposed that the higher mental functions and skills individuals come to possess first appear on the social level, and later, through cooperative interactions with an adult or more capable peers, appear at the individual level.

> An interpersonal process is transformed into an intra-personal one. Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychologically), and then inside the child (intrapsychologically). This applies to voluntary attention, to logical memory and to the formation of concepts. All the higher functions originate as actual relations between human individuals (p. 57).

Vygotsky's zone of proximal development (1978, 1962) has provided researchers with a tool with which to understand how this transition occurs. The zone represents a phase in development where a person is unable to perform a task alone but can eventually accomplish and internalize it with the help and supervision of someone more experienced.

Bruner (1982) has described the zone as "the child's ability to recognize the value of hints and props even before he is conscious of their full significance" (p. 852). For Vygotsky, a key ingredient for learning within the zone of proximal development was instruction that proceeded ahead of maturing abilities. The more experienced person takes major responsibility for structuring the interaction, leading the other through the steps of a task, and providing the necessary support until the learner is able to do the task independently.

> Instruction is good only when it proceeds ahead of development, when it awakens and rouses to life those functions which are in the process of maturing or in the zone of proximal development. It is in this way that instruction plays an extremely important role in development (Vygotsky, 1956; p. 278; Quote from Laboratory of Comparative Human Cognition, 1983; pp. 334-335).

Wertsch (1981) notes that some western investigators have taken seriously the issue of the social origins of cognitive abilities. Cole and Scribner (1974, 1977; see also Scribner & Cole; 1981) have emphasized that researchers must understand how cognitive tasks fit into the child's cultural activities, especially when performing school-like tasks for intelligence tests. Cognitive deficits are frequently assumed on the basis of psychological tests when, after manipulation of the task enviroment, the child performs the task competently (Erickson, 1984, 1986; Mehan, 1981). Further, Vygotsky's theory of learning has influenced how western psychologists assess children's intelligence. Instead of focusing solely on individual accomplishments, children's ability to take advantage of hints and props is being viewed as a more adequate gauge of intelligence (Brown & French, 1979).

The Laboratory of Comparative Human Cognition (1983) has continued and expanded this line of research. Their work centers on how cultures arrange the selection of learning contexts for children. Further, they've studied how learning occurs among participants working within the zone of proximal development. Reseach on everyday cognition (Rogoff & Lave, 1984) is part of the tradition of these studies. Cognitive psychologists studying everyday cogntion have described how learning occurs in a variety of social contexts, ranging from observing adults as they calculate and compare supermarket food prices (Lave, Murtaught & de la Rocha, 1984) to studying mothers preparing their 6-9 year olds for memory tasks like those at home and school (Rogoff & Gardner, 1984). As with other western psychologists studying culture and cognition, they see thinking as "intricately interwoven with the context of the problem to be solved" (Rogoff, 1984; p. 2). Further, they argue that skills children apparently do not possess when performing laboratory tasks "appear well developed when these same children meet similar problems in familiar contexts" (Rogoff, 1984; p. 2). Rogoff states further that cognitive abilities achieved in one context do not generalize to other domains. Yet, since some aspects of knowledge and skills do generalize to new situations, they have focused on how the more experienced member creates links "between the context of a novel problem and the more familiar problem contexts" (Rogoff & Gardner, 1984; p. 96).

Guiding instruction in everyday and school contexts. According to these researchers, how adults support learning in everday contexts can be applied to school learning contexts. Greenfield (1984), for example, studied how adults provide "scaffolds" to children learning within the zone

of proximal development. The scaffold metaphor suggests that the teacher builds on what the learner can do, and "thus closes the gap between task requirements and the skill level of the learner" (p. 118). She compared how scaffolding occurred to young (1-2 year old), middle class children learning the rudiments of language development from their mother with how 7-15 year old members of a subsistent Indian culture learn to weave. After summarizing the similarities of support between the two contexts, she questions "the extent to which school instruction could be improved by greater use of the principle of scaffolding" (p. 137).

Rogoff & Gardner (1984) studied how scaffolding occurred as thirty-two middle class mothers taught their 6-9 years children how to remember classification tasks resembling home and school activities. The school task involved organizing photographs of ordinary household objects into a tray divided into boxes, while the home task dealt with putting grocery items away on shelves in a makeshift kitchen. The child performed the kitchen task first, thereafter the school-like task. The authors focused on what types of interactions the mother used to guide "the child in transferring relevant concepts from more familiar settings to the relatively novel laboratory task" (Rogoff & Gardner, 1984; p. 101). For the authors, the key point is that the mother must establish a context for the learner so that the interaction is intelligible and the learner can understand the new information. In this way, she is able to support performance at a level that the learner alone would be incapable of accomplishing. It is important to examine how these researchers believe learning within the zone of proximal development is accomplished, and whether their description is similar to Vygotsky's.

Rogoff and Gardner (1984) state that during instructional interaction between the mother and her child the mother created a familiar problem context to guide the transfer of skills and information (p. 98). Further analysis of their study suggests that the authors believe the school task should be connected to what the child is already familiar with in everyday contexts. By the mother making references to the child's familiar home context, the authors think that the child's competence in the school-like task is facilitated.

> The mother begins, as the experimenters suggested, by relating the experimental task to the more familiar task of organizing a kitchen after returning from the store (p. 99).

After describing a part of the dialogue between the mother and the child, Rogoff and Gardner state the "child can interpret the mother's instructions relevant to the laboratory task according to the sequence of actions implied by the evocation of the familiar context" (p. 99). As the mother teaches her child the school-like task, Rogoff and Gardner make the following claim:

> In instruction using the zone of proximal development, the adult oversees the construction of an instructional task by establishing references to what the child already knows. The context allows the child to build new information or skills into the existing knowledge structure (p. 101).

The authors connected the way the mothers scaffolded the children's learning with Wertch's and Stone's (1979) concept of successful instruction, where the teacher "integrates explanation and demonstration with an emphasis on the learner's participation in the instructional activity" (Rogoff and Gardner, 1984; p. 102). This is then linked up with teaching and learning in both formal school and informal everyday learning.

For both these contexts, learning within the zone of proximal development proceeds along the same path. Instruction should emphasize connections to what the learner already knows in other familiar, everyday contexts. There is no suggestion that children's everyday concepts may be a hindrance to school learning, nor any mention that school learning is different from learning in everyday contexts. For Vygotsky, however, the school enviroment is the creation of a special context for purposes distinct from everyday learning. Collaborative interaction within the zone of proximal development focuses on teacher support of student learning as students try to understand decontextualized scientific concepts. It is questionable whether efforts to immediately connect subject matter to students' everyday concepts and experiences fosters their cognitive development.

Vygotsky: School Learning within the Zone of Proximal Development

What characterizes the higher psychological functions according to Vygotsky is reflective control and deliberate awareness, much like the intellectual skills associated with metacognition. Although children about to enter school are capable of showing attention and remembering, these functions are much less under their deliberate control. Vygotsky sought to understand how children's various functions (such as attention, memory, and perception) develop and become distinct. As part of his research program, Vygotsky studied the characteristics of students' everyday concepts, and how these concepts became subject to their deliberate control.

His research suggested that children's everyday concepts, those learned in "a face-to-face meeting with a concrete situation" (Vygotsky, 1962, p. 108) are unsystematized and characterized by a lack of conscious

awareness. Though children are able to talk about the concepts spontaneously and correctly, they have difficulty focusing on them.

> In operating with spontaneous (everyday) concepts, the child is not conscious of them because his attention is always centered on the object to which the concept refers, never on the act of thought itself (Vygotsky, 1962; p. 92).

For example, Vygotsky claims that children may know how to use the words "because" or "brother" correctly, but still nondeliberately. However, when asked abstract questions about the concepts separate from their immediate, concrete experiences, children have difficulty answering correctly. What accounts for these aspects of children's thought is primarily their "lack of distance from immediate experience" (p. 116).

Vygotsky believed that children develop deliberate control over everyday concepts through contact with scientific concepts.[2] Scientific concepts begin in a way opposite from everyday concepts. While children become aware of their everyday concepts much later,

> (t)he development of a scientific concept, on the other hand, usually begins with its verbal definition and its use in non-spontaneous operations--with working on the concept itself. It start its life in the child's mind at the level that his spontaneous concepts reach only later (p. 108).

It is through learning concepts <u>separate</u> from the child's immediate, concrete experiences, structures are provided "for the upward development of the child's spontaneous concepts toward consciousness and deliberate control" (p. 109).

Vygotsky's description of experiments involving second and fourth grade children helps to underscore this point. The students were given structurally similar problems dealing with course concepts in social studies and problems involving situations in their daily lives. The

children were asked to make up stories from a group of pictures that showed the beginning of an action, and complete fragments of sentences ending in "because" and "although". For example, in the situation involving everyday life, students would be asked to complete sentences like: "The boy went to the movies because . . . ," or, "The girl cannot read although . . ." In the situations involving social studies classes, students would complete sentences involving course concepts that were separate from students' familiar concepts. Although one might expect that students would perform better on sentence completions involving their everyday experiences, the problems involving decontextualized social studies concepts were solved more often than the problems involving everyday concepts. To explain the differences, Vygotsky suggested that "the child must find it hard to solve problems involving life situations because he lacks awareness of his concepts and therefore cannot operate with them at will or as the task demands" (Vygotsky, 1962; p. 106).

Thus, as children understand systematically organized concepts learned in school, this is "transferred to everyday concepts, changing their psychological structure from top down" (Vygotsky, 1962; p. 93). However, a teacher cannot simply ask children to memorize scientific concepts, have them tested, and expect this to be adequate. First of all, the childrens' everyday concepts must have reached a certain level already. For example, if a child does not understand causal (because) relationships in everyday speech, the child cannot be expected to understand them embedded in scientific concepts. But, understanding causal relationships in everyday speech does not mean that the child has deliberate control over these concepts. Adults, however, working within this zone of proximal

development can provide assistance. Secondly then, collaboration between teacher and pupil is essential for cognitive growth.

Vygotsky does not suggest that teachers working within students' zones of proximal development make immediate connections to what the learner already knows. Initially, the students will fail to establish any connection between academic concepts and events in their daily lives (Luria, 1976). Later, "in the course of further schoolwork and reading" (Vygotksy, 1962; p. 108), the concepts students understood in outline are connected to their personal experiences. Vygotsky suggests that the teacher guides instruction through helping the student understand the systematic relationships between concepts. He writes, for example, that an elementary student is able to successfully complete sentences on social science subjects such as: "Planned economy is possible in the U.S.S.R because there is no private property--all land, factories, and plants belong to the workers and peasants" (Vygotsky, 1962; p. 107). For Vygotsky, the student is able to accomplish this because

> the teacher, working with the pupil, has explained, supplied information, questioned, corrected, and made the pupil explain. The child's concepts have been formed in the process of instruction, in collaboration with an adult. In finishing the sentence, he makes use of the fruits of that collaboration, this time independently. The adult's help, invisibly present, enables the child to solve such problems earlier than everyday problems (Vygotsky, 1962; p. 107).

Vygotsky's description of teacher-student interaction within the zone of proximal development suggests that the teacher's role focuses on helping the student understand decontextualized, systematic concepts. He does not urge that succesful instruction depend on making connections to what the

student already knows in more familiar settings.

Bruner's (1982) examples of learning within the "zone of potential development" support the view that the primary focus is on the adult's assistance as the student tries to understand the relationships between concepts--not how connections are made to the student's everyday concepts. Bruner also points out the importance of schooling as "joint culture-creating, and later compares the zone to the way "Socrates guides the slaveboy through geometry in the Meno--a kind of negotiation in which the abler frames the questions, the less able replies and gains in insight" (p. 852). Bruner also claims that the more recent research of Collins' and his colleagues on Socratic tutoring programs illustrates how the teacher supports learning within the zone of proximal development. Collins and Stevens (1982) analyzed how expert teachers guide student learning in various disciplines. In geography, for example, there are a number of different factors that could affect rice growing in a country, such as fresh water, a fault area, fertile soil, and warm temperature. As the authors point out, the teacher can use various strategies to help students understand the relationships between concepts in a discipline.

> If a student says they do not grow rice in Oregon because it lacks a flat terrain (which is unecessary), one can pick Japan which is also mountainous, but produces rice. . . If a student thought rice could not be grown in Wyoming because it is too dry (which is insufficient because it is also too cold), the teacher could ask, "Suppose that it rained a lot in Wyoming, do you think they could grow rice then?" . . . (Collins & Stevens, 1982; pp. 80-81).

In these and other examples from their research, teachers try to guide students' understanding through providing hints and props that help them grasp how the concepts in the discipline are related to one another. It

is this kind of collaborative support that Vygotsky considered integral to learning within the zone of proximal development. Initial and frequent connections to students' everyday concepts are not essential. His characterization of students' everyday concepts suggests that they may even interfere with learning scientific concepts. Current research in science education supports this view.

Everyday concepts: Impediments to learning scientific concepts. Rogoff's and Gardner's study (1984) indicates that the mothers helped their children to understand the concepts in the school task by showing their relationship to the children's everyday learning. It was through showing how similar the ideas were in the two different tasks that the children were able to assimilate the school task to their existing knowledge and experiences. The authors state that with one mother,

> She points out the relevance of transferring information from the familiar setting to the novel one for successful test performance: "See, it's the same idea."

While this kind of assimilative learning may sometimes promote learning, there are important limitations. First, as already discussed, the authors tend to emphasize the importance of making connections to what is already familiar to students. This approach, however, is a restricted view of assimilative learning. Tasks can be related to any number of things already known, including academic knowledge (Floden & Buchmann, 1984). Second, such an emphasis may neglect that learning in the disciplines often requires significant conceptual change which is initially confusing and unsettling. Connections to students' existing knowledge may not foster their understanding, but reinforce their misconceptions.

Driver (1983) argues that as students learn unfamiliar scientific

concepts they immediately try to interpret them in terms of their own intuitive notions. By making the unfamiliar familiar, students hope to understand a new framework that is foreign and discomforting. This strategy, however, often results in students misunderstanding important concepts during instruction. Roth (1985), for example, describes how students related the way plants obtain food to their everyday understanding of what food is for humans. The students believed that food for plants was what the plants take in or "eat," such as water, fertilizer or sunlight. This misconception impeded their understanding of key concepts in photosynthesis, particularly, that plants make their own food. In like manner, students learning about light believed that they saw objects "because light shines on things and brightens them up" (Eaton, Anderson, & Smith, 1984), rather than being reflected off the objects. Students resisted relinquishing these faulty notions even after further instruction in the concepts being studied. Thus, teachers can not view students' everyday ideas as something that can be built upon and refined. Though it is helpful that teachers take into consideration students' preconceptions during instruction (Roth, 1985; Driver, 1983), sharp breaks between school instruction and students' everyday concepts may more likely promote students' scientific understanding (see Floden, Buchmann, & Schwille, 1984; in press).[3]

This argument is also interesting because it suggests that whether or not there are general cognitive abilities that transfer across contexts, connections to students' everyday concepts to facilitate their understanding of subject matter are still very problematic. One of the

main reasons everyday cognition researchers focus on social contexts is because they attribute less power to general cognitive abilities. As a result, they are interested in understanding how skills or knowledge learned in one context are accessed and transferred across contexts. They believe this is facilitated, as stated, through making connections to what the learner knows in familiar contexts. While Vygotsky (1962) clearly argued that schools can develop general intellectual skills, the extent to which there is broad transfer of skills, and whether schooling can accomplish this are quite controversial topics (see Laboratory of Comparative Human Cognition, 1983; Royer, 1979; Scribner & Cole 1981). Nevertheless, even if the broad transfer of knowledge and skills is doubtful, this does not justify trying to build on or refine students' everyday concepts as they learn disciplinary concepts. As the research in science education suggests, science concepts are often so dissimilar to students' everyday concepts that attempts to build upon them lead to further misunderstanding.

Conclusion: Rethinking the ZPD for School Instruction

While parts of Vygotsky's work support the contemporary analyses of learning outside school, the studies seldom acknowledge that Vygotsky also stressed the importance of discontinuity in school learning. One aspect of Vygotsky's theory, the zone of proximal development, is used to understand cognition in everyday contexts without recognizing Vygotsky's critical distinctions about the limitations of everyday concepts to promote school learning.

This use of Vygotsky's theory is common among other educational researchers, and seems plausible because of the isolated work many students do in school. A teacher instructing a class often works with a few dozen students, and is unable to monitor each one closely and adjust the task accordingly. Erickson (1984), for example, states that school learning enviroments remove the teacher's opportunities to scaffold childrens' attempts at problem solving, especially during tests. These criticisms of schooling are apt, though it does not follow from them, as Erickson suggests, that school learning must be more closely connected with students' everyday life. Applebee and Langer (1984), drawing on Vygotsky's theory, analyzed how teachers provided elementary and middle school students with instructional scaffolds as they tried to understand the effects of convection, electricity, and states of matter. These authors also argue that students engaged in classroom tasks are usually not provided adequate support, or the tasks are so simple, no support is needed. Examples are essay questions that test whether students have learned the material covered in the text or lecture, or multiple-choice and fill-in-the-blank exercises.

Their analysis, however, seems more consistent with Vygotsky's and Bruner's characterizations of support within the zone of proximal development. For Applebee and Langer, it is crucial that the task has a clear overall purpose that guides separate activities within the whole. Also, the task must be something that students can do with help but cannot do alone, and thus involve abilities that have not yet matured but are in the process of maturation, or in Vygotsky's (1962) terms, abilities are not so much 'ripe' as 'ripening'" (Applebee & Langer, 1984; p.

185). Importantly, as teachers structured the tasks and interacted with students, the researchers described how teachers built on knowledge the students already knew from previous science lessons. Moreover, the authors point out how the teachers could have provided more support within the structure of the task, and claim that their framework is generalizable to reading, writing, or discussion activities in any area of the curriculum.

Thus, their analysis of teachers' instructional scaffolding, while taking into consideration the lack of support students usually receive in school, also avoids the emphasis on connections to students' everyday concepts. It is important, as cognitive psychologists and anthropologists have emphasized, that instruction be sensitive to the cultural context in which it occurs. But this does not mean that school learning must be continuous with these cultures or, more specifically, that successful instruction within the zone of proximal development is dependent upon making school learning compatible with native cultures (Zeuli & Floden, 1986).

This compatibility seems to be assumed in much research using Vygotsky's theory to improve classroom instruction and student achievement (e.g., see Tharp, et.al., 1984). But if this means that teachers, as they provide instructional support, try to make connections to the students' everyday life, then there remains an unresolved difficulty between this view and Vygotsky's position. The interpretation does not take into account Vygotsky's analysis of the limitations of students' everyday concepts, or his emphasis upon discontinuity. Since Vygotsky's zone of proximal development continues to serve as an influential framework for understanding learning in everyday and school contexts, it is important

that researchers applying it to school settings incorporate his analysis of the limitations of everyday concepts. As applied to school instruction, this is certainly no straightforward task. Yet, discussion and further study of the issued raised in this critique will help clarify the central educational questions Vygotsky raised, and hopefully raise questions for educators interested in improving classroom instruction.

Footnotes

[1] The author gratefully acknowledges the intellectual support provided by Robert E. Floden and Margret Buchmann. Particularly, their work (Floden, Buchmann, & Schwille, 1984; in press) led me to rethink my interpretation of Vygotsky's learning theory as applied to educational settings. I remain responsible for any errors in extrapolation that might remain.

[2] Scientific concepts for Vygotsky include those concepts used in the natural sciences and social sciences. Many of his examples are from the social sciences.

[3] These authors have criticized the assumption that school instruction should be closely tied to students' experiences outside school. They argue instead that schools should provide students with educative breaks from their everyday experiences in order to further students' objective judgment and scientific understanding.

References

Applebee, A.N., & Langer, J.A. (1984). Instructional scaffolding: Reading and writing as natural language activities. In J.M. Jensen (Ed.), Composing and comprehending (pp. 183-190). Urbana, IL: ERIC Clearinghouse on Reading and Communication Skills.

Brown, A., & French, L. (1979). The zone of proximal development: Implications for intelligence testing in the year 2000. Intelligence, 3, 252-271.

Bruner, J. (1982). The language of education. Social Research, 49, 835-853.

Cole, M., & Scribner, S. (1974). Culture and thought: A psychological introduction. New York: Wiley.

Cole, M., & Scribner, S. (1977). Cross-cultural studies in memory and cognition. In R.V. Kail Jr. & J.W. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, NJ: Lawrence Erlbaum.

Collins, A., & Stevens, A.L. (1982). Goals and strategies of inquiry teachers. In R. Glaser (Ed.), Advances in instructional psychology. Vol. 2. Hillsdale, NJ: Erlbaum.

Driver, R. (1983). The pupil as scientist?. Milton Keynes, England: Open University Press.

Eaton, J., Anderson, C., & Smith, E. (1984). Students' misconceptions interfere with science learning: Case studies of fifth-grade students. Elementary School Journal, 84, 365-379. (Also available as IRT Research Series No. 128. East Lansing: Michigan State University, Institute for Resesarch on Teaching.)

Erickson, F. (1986). Qualitative research on teaching. In M. Wittrock (Ed.), Handbook of research on teaching, 3rd edition. New York: MacMillan, pp. 119-161.

Erickson, F. (1984). School literacy, reasoning, and civility: An anthropologist's perspective. Review of Educational Research, 54, 525-546.

Floden, R.E., & Buchmann, M. (1984). The trouble with meaningfulness. IRT Occational Paper No. 82. East Lansing, MI.: Michigan State University, Institute for Research on Teaching.

Floden, R.E., Buchmann, M. & Schwille, J.R. (April, 1984). The case for the separation of home and school. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Floden, R.E., Buchmann, M. & Schwille, J.R. (in press). To be schooled against the self-deceptions of everyday life. East Lansing, MI: Michigan State University, Institute for Research on Teaching.

Greenfield, P.M. (1984). A theory of the teacher in the learning activities of everyday life. In B. Rogoff & J. Lave, (Eds.), Everyday cognition: its development in social context. Cambridge, MA: Harvard University Press.

Laboratory of Human Cognition. (1983). Culture and Cognitive Development. In P.H. Mussen & W. Kessen (Eds.), Handbook of Child Psychology. Vol. 2. New York: John Wiley & Sons.

Lave, J., Murtaugh, M., & de la Rocha, O. (1984). The dialectic of arithmetic in grocery shopping. In B. Rogoff & J. Lave (Eds.), Everyday cognition: its development in social context. Cambridge, MA: Harvard University Press.

Luria, A.R. (1976). Cognitive Development: Its cultural and social foundations. (M. Lopez-Morillas & L. Solotaroff, trans.), Cambridge, MA: Harvard University Press.

Mehan, H. (1981). Social constructivism in psychology and sociology. The Quarterly Newsletter of the Laboratory of Comparative Human Cognition. 3, 71-77.

Rogoff, B. & Gardner, W. (1984). Adult guidance of cognitive development. In B. Rogoff & J. Lave (Eds.), Everyday cognition: its development in social context. Cambridge, MA: Harvard University Press.

Rogoff, B. (1984). Introduction: thinking and learning in social context. In B. Rogoff & J. Lave (Eds.), Everyday cognition: its development in social context. Cambridge, MA: Harvard University Press.

Roth, K. (1985). Food for plants: Teacher's guide(Research Series No. 153). East Lansing, MI.: Michigan State University, Institute for Research on Teaching.

Royer, J.M. (1979). Theories of the transfer of learning. Educational Psychologist, 14, 53-69.

Scribner, S., & Cole, M. (1981). The consequences of literacy. Cambridge, MA: Harvard University Press.

Tharp, R.G., Jordan, C., Speidel, G.E., Au, K.H., Klein, T.W., Calkins, R.P., Sloat, K.C.M., & Galimore, R. Product and process in applied developmental research: Education and the children of a minority. In M.E. Lamb & A.L. Brown (Eds.), Advances in developmental psychology. Vol. 4. Hillsdale, NJ: Lawrence Erlbaum.

Vygotsky, L.S. (1956). Collected psychological research. Moscow: Izdatel'stvo Akademii Pedagogicheskikh Nauk (In Russian).

Vygotsky, L.S. (1962). Thought and language. Cambridge, MA: M.I.T. Press.

Vygotsky, L.S. (1978). Mind in society: The development of higher psychological processes. (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Cambridge, MA: Harvard University Press.

Wertsch, J.V. (1981). Trends in soviet cognitive psychology. Bologna, Italy: Societa Editrice Il Mulino.

Zeuli, J.P. & Floden, R.E. (1986). Cultural inequalities and incongruities: Implications for teacher educators?. Unpublished manuscript. East Lansing, MI.: Institute for Research on Teaching.